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Enhanced electron/fuel-ion equilibration through impurity ions: Studies applicable to NIF and Omega. R.D. PETRASSO, H. SIO, N. KABADI, B. LAHMANN, R. SIMPSON, C. PARKER, J. FRENJE, M. GATU JOHNSON, C.K. LI, F.H. SEGUIN, MIT, H. RINDERKNECHT, D. CASEY, P. GRABOWSKI, F. GRAZIANI, LLNL, W. TAITANO, A. LE, L. CHACON, N. HOFFMAN, G. KAGAN, A. SIMAKOV, A. ZYLSTRA, LANL, M. ROSENBERG, R. BETTI, LLE, B. SRINIVASAN, V. Tech, R. MANCINI, U of Nev/Reno — In shock-driven exploding-pushers, a platform used extensively to study multi-species and kinetic effects, electrons and fuel ions are far out of equilibrium, as reflected by very different temperatures. However, impurity ions, even in small quantities, can couple effectively to the electrons, because of a Z^2 dependence, and in turn, impurity ions can then strongly couple to the fuel ions. Through this mechanism, electrons and fuel-ions can equilibrate much faster than they otherwise would. This is a quantitative issue, depending upon the amount and Z of the impurity. For NIF and Omega, we consider the role of this process. Coupled non-linear equations, reflecting the temperatures of the three species, are solved for a range of conditions. Consideration is also given to ablatively driven implosions, since impurities can similarly affect the equilibration. This work was supported in part by DOE/NNSA DE-NA0002949 and DE-NA0002726.

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